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LIME REPORT  
1919

JAMES W. KELLOGG, Chief Chemist  
BUREAU OF CHEMISTRY



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## LETTER OF TRANSMITTAL

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DEPARTMENT OF AGRICULTURE  
BUREAU OF CHEMISTRY

Harrisburg, Pa., February 18, 1920.

Hon. Fred Rasmussen,  
Secretary of Agriculture,  
Harrisburg, Pa.

Dear Sir:—I have the honor to transmit herewith for your approval a report showing the results of inspection of Lime Products sold for agricultural purposes and received from the special Agents of the Department during the Spring and Fall seasons of 1919.

It is recommended that this report be published in bulletin form for distribution.

Very respectfully,

JAMES W. KELLOGG,  
Chief Chemist.



# LIME REPORT

1919

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## INTRODUCTION

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In accordance with the provisions of the Law regulating the sale of Lime Products for agricultural purposes, the special Agents of the Department obtained from selling Agents throughout the State during the Spring and Fall inspection seasons, 215 official samples of agricultural lime. Of this number 187 samples representing 66 registered brands, the output of 52 Companies, the sale which came under the requirements of the law, were analyzed to determine whether or not the guarantees required to be affixed to packages were correct. The official samples included 5 different kinds of agricultural lime and were classified in 7 groups together with the number of samples in each, as follows: Pulverized Limestone 56; Artificial Carbonate of Lime 18; Marl 3; Lime or Burned Lime 15; Hydrated Lime 85; Gypsum 3 and Miscellaneous 7. Each sample was analyzed for calcium oxide, magnesium oxide and insoluble matter. In the case of Pulverized Limestone and Artificial Carbonate of Lime determinations were also made for the degrees of fineness, or the size of sieve-mesh through which the coarsest particles would pass, as well as the proportion which would pass a No. 10, No. 50 and No. 100 mesh sieve and the percentages of calcium and magnesium oxides were estimated to their equivalent carbonate forms. In the case of Lime or Burned Lime determinations were made for carbon dioxide which indicates the amount of "core" or the proportion of unburned limestone remaining. The samples of Gypsum were analyzed for calcium oxide and sulphur trioxide and the proportion of calcium as calcium sulphate or gypsum estimated. The results of analyses of each sample have been tabulated and included in the Tables which follow according to the foregoing classification. In a number of cases the sacks were not found to be printed or cards attached showing the full information as required. An improvement in the method of labeling and guaranteeing was noted compared with the conditions existing during 1918. The results of analyses of samples also show an improvement in the correctness of guarantees as a less number of deficiencies were

noted than were found upon analyses of the samples received during last year. There is still room for improvement, however, as one-third of the samples analyzed failed to meet their guarantees, the greatest number of deficiencies being found in the case of Burned Lime and Hydrated Lime where more than one-half of the former and about one-third of the latter samples were deficient. In a number of these cases the deficiencies were more than 1 per cent. below the guarantees.

In addition to the official samples 55 special samples of Lime Products were received from residents of the State and analyzed for a fee of \$1.00, as provided by the Lime Law, and reports of the results of analyses together with receipts for fees were submitted to the senders as soon as possible after the work had been completed. As many of these samples were submitted for the purpose of determining the guarantees to be used in registering and labeling before being offered for sale, and in order that the character of the Lime Products might be learned and further, as the analyses were in the nature of private information to those personally interested, the results are not included in this report.

The results of analyses of each sample together with the brand names, names and addresses of Manufacturers, Importers and Selling Agents, the guarantees and retail selling prices have been classified in 7 groups and tabulated as follows: Table I includes Pulverized Limestone, Artificial Carbonate of Lime and Marl; Table II, Lime and Hydrated Lime; Table III, Gypsum or Land Plaster; and Table IV, Miscellaneous samples. In the following pages will also be found the Acknowledgments, a copy of the Lime Law, information regarding Registration, Analyses of Special Samples, Required Labeling, Average Analyses and Retail Prices and a Discussion of The Results of Inspection.

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#### ACKNOWLEDGMENTS.

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The reception and preparation of samples and the immediate supervision of the analytical work were in charge of Mr. V. B. Hausknecht, First Assistant Chemist, who also made duplicate analyses and check determinations where required. The chemical analyses of the samples were made by Messrs. William Weber, G. J. Kuhlman, Jr., and Frank Williams. The samples were prepared for analysis by Mr. W. W. Cassel and Mr. W. E. Huber prepared the tables and arranged other data for this Report.

## LIME LAW.

No. 306.

## AN ACT

To regulate the sale for agricultural purposes of crushed limestone, lime, gypsum, and related products; defining said products; and prescribing penalties for the violation of this act.

Section 1. Be it enacted, &c., That every bag, barrel, or other package or quantity, of any pulverized limestone, ground oyster shells, artificial carbonate of lime, ground lime, spraying lime, slaked-lime, hydrated lime, hydrated spraying lime, marl, gypsum, or land-plaster, sold, offered, or exposed for sale, within this Commonwealth for use as a soil amendment or as an ingredient or reagent in the preparation of any fungicide or insecticide, shall have attached to it or be accompanied, in a manner provided in section three hereof, by a plainly printed statement giving the name and address of the manufacturer or importer and his place of business, the brand or trade-name of said material, the net weight of the contents of the package, when sold in package, and a statement declaring, with respect to pulverized limestone, ground oyster shells, and artificial carbonate of lime: (a) The degree of fineness of the material, in terms of the minimum sieve-mesh, expressed in fractions of an inch, through which the coarsest particles of said material can pass; and (b) the minimum percentages contained of available oxides of calcium and magnesium, respectively, combined as carbonates; with respect to lime, ground lime, spraying lime, slaked-lime, hydrated lime, hydrated spraying lime, and marl, the minimum percentages contained of the available oxids of calcium and magnesium, respectfully; and with respect to gypsum, or land-plaster, the minimum percentages contained of available calcium oxide and sulphur trioxide, or sulphuric acid ( $SO_3$ ) respectively; which statement shall be held to be the guaranty of the manufacturer or importer that the goods to which said statement refers are of the kind and quality, or composition and fineness, so set forth. The provisions of this act shall not, however, apply to air-slaked lime, kiln-slakes, gas-house lime, or tanners' lime, when sold as such.

Section 2. For the purpose of this act, the materials named in the foregoing section are defined as follows:—

(1) Limestone is the rock commonly known by that name, and consisting chiefly of calcium carbonate, or of said carbonate with a smaller molecular proportion of magnesium carbonate.

(2) Pulverized limestone is limestone reduced by mechanical means to a fine powder.

(3) Artificial carbonate of lime is carbonate of lime artificially produced by any method other than the exposure of lime, ground lime, slaked-lime, hydrated lime, or spraying lime to the action of the atmosphere.

(4) Lime is the product obtained by the complete burning of limestone in a kiln, and capable of being reduced by slaking to a fine powder.

(5) Ground lime is lime reduced to a fine powder by grinding.

(6) Spraying lime is lime of high purity, containing not less than ninety-three per centum of calcium oxide and not more than five per centum of magnesium oxide, not more than five per centum of carbon dioxide, nor more than five per centum of acid insoluble matters, iron or aluminum oxides, collectively.

(7) Slaked-lime is the dry finely divided product obtained by the addition of water to lime.

(8) Hydrated lime is slaked-lime prepared by the aid of stirring, or of stirring, grinding, and screening machinery, and is free from hard lumps.

(9) Hydrated spraying lime is dry finely divided hydrated lime of purity not less, after taking the water of hydration into account, than that herein required in the case of spraying lime, and of such fineness that all shall pass a standard sieve of one hundred meshes to the inch.

(10) Air-slaked lime is the more or less finely divided product obtained when lime, slaked-lime, hydrated lime, or spraying lime is exposed for a considerable time to the action of the air.

(11) Marl is clay highly charged with carbonate of lime. Shell marl is marl in which the carbonate of lime is present chiefly in the form of molluscan shells.

(12) Gypsum, or land-plaster, is the finely divided mineral, commonly known by that name, and consisting chiefly of calcium sulphate.

(13) Kiln-slakes is refuse lime mixed with ashes and "core," or imperfectly burned limestone.

(14) Gas-house lime is spent lime that has been used as a purifier in the manufacture of illuminating gas.

(15) Tanner's lime is spent lime that has been used in the curing of hides.

Section 3. The statement required by section one of this act shall, in the case of goods sold in package, be plainly printed upon the package, or upon a tag or label fastened thereto, of such quality and

in such manner that it shall not be detached in handling, and, in the case of goods sold in bulk, the said statement shall be delivered to the purchaser either with the invoice therefor or with the goods.

Section 4. Every manufacturer or importer of one or more of the materials named in section one of this act, for either or both of the purposes therein stated, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth for either of said purposes, file annually with the Secretary of Agriculture a statement of the names and number of brands of such materials having distinct trade-names that he shall offer for sale, for either or both of said purposes, during the next ensuing calendar year or remainder thereof, together with a copy of the statement declaring the composition of these several brands of said materials, as required by section one of this act.

Section 5. In addition to the statement required by section four of this act, every manufacturer or importer of any of the materials named in section one of this act shall on or before the first day of January of each year, or before offering them for sale within this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing, as nearly as practicable, the weight of each brand of said materials sold by him, or, if the producer or vendor be a firm or corporation, by its managers, officers, and agents, within this Commonwealth, for either or both of the purposes named in section one of this act, during the last preceding year; and for each brand so sold he shall pay to the Secretary of Agriculture a license fee, according to the weight sold, as follows: For an amount exceeding one hundred tons, but not exceeding one thousand tons, five dollars; for an amount exceeding one thousand tons, but not exceeding five thousand tons, ten dollars; and for an amount exceeding five thousand tons, twenty dollars; and when said fees shall have been paid, and the statements required by section four of this act have been filed with Secretary of Agriculture, the party or parties who have made such payment, and otherwise complied with the provisions of this act, shall be entitled to sell within the Commonwealth the goods specified in said statement and covered by said fees during the year, or fraction of a year, immediately following said statement. If the manufacturer or importer shall not have made during the preceding year any sales within the Commonwealth, for the aforesaid purposes, of any brand to be offered for sale during the year for which the fee is to be paid, he shall pay for each such brand a fee of five dollars. All moneys so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 6. Any person or persons selling, offering, or exposing for sale, for either of the purposes stated in section one of this act, any of the materials named therein or brand of the same, unless accompanied by the statement required by section one of this act, or, when so accompanied, if the said statements shall be false in any particular, or without having complied with all the foregoing provisions of this act, shall be guilty of a misdemeanor; and on conviction shall be sentenced to pay a fine of not less than ten nor more than fifty dollars for the first offense, and not less than one hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act; and all penalties, costs, and fines received shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 7. The Secretary of Agriculture is hereby empowered to collect samples of the materials named in section one of this act, either in person or by his duly qualified agent or representative, to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of business, quarries, kilns, factories, barns, buildings, carriages, cars, and vessels used in the manufacture, storage, transportation, or sale of any of the said materials. They shall also have power to open any package or vessel containing or supposed to contain any of the said materials, and to take therefrom samples for analysis, upon tendering the value of said samples. Any manufacturer or producer of any of the materials named in section one of this act, located in the Commonwealth, shall be entitled to have a single sample of any distinct brand, for the sale of which he has paid the fee required by section five of this act, analyzed by the Department of Agriculture, under such regulations as the Secretary of Agriculture may prescribe with respect to the points of composition specified in said section one, upon sending sample properly sealed and carriage prepaid, together with a fee of one dollar for each such analysis; but not more than two brands shall be analyzed, under the privilege conferred by this proviso, for one manufacturer or producer in a single year. None of the provisions of this act shall apply to sales of limestone, or limestone products or marl, when such sales are made at the quarry or pit in bulk, and delivered to the wagons of the users, who are presumed to be acquainted with the qualities of the local products.

Section 8. To carry out the provisions of this act for the period ending June first, one thousand nine hundred and seventeen, the sum of four thousand dollars (\$4,000), or so much thereof as may be necessary, is hereby specifically appropriated to the Department of Agriculture.

Section 9. This act shall go into effect on the first day of January, one thousand nine hundred and sixteen.

APPROVED—The 1st day of June, A. D. 1915.

MARTIN G. BRUMBAUGH.

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#### REGISTRATIONS.

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With the exception of air-slakes, kiln-slakes, gas-house lime and tanner's lime when sold as such, all Lime Products, before being sold or offered for sale for agricultural purposes, are required to be registered with the Department of Agriculture on or before January 1 of each year or before being placed on sale. Those desiring to sell agricultural lime in the State should request the Bureau of Chemistry, Pennsylvania Department of Agriculture, Harrisburg, to send them blank registration forms in which should be inserted the following information: A statement of the brand names of the Lime Products to be placed on sale, an affidavit of the number of tons sold, if any, during the preceding year, and a statement of the guarantees for each brand to be registered and sold. The guarantees required are as follows: For ground or pulverized limestone, ground oyster shells and artificial carbonate of lime; The minimum percentages contained of calcium oxide and its equivalent as calcium carbonate; for magnesium oxide, and its equivalent as magnesium carbonate and the degree of fineness or the number of sieve-mesh through which the coarsest particles or all of the material will pass upon sieving; for lime or burned lime, either in lump or ground form, hydrated lime, slaked lime, spraying lime and marls; the minimum percentages contained of calcium oxide and magnesium oxide; for gypsum or land plaster the minimum percentages contained of calcium oxide and sulphur trioxide. The registration fees required, are five (\$5.00) dollars for new brands, where no sales have been made during a previous year, and from \$5.00 to \$20.00 based upon the number of tons sold, namely; 100 to 1,000 tons, \$5.00; 1,000 to 5,000 tons, \$10.00; and for an amount exceeding 5,000 tons, \$20.00. Upon receipt of forms for

application for registrations properly made out, together with certified checks made payable to Fred Rasmussen, Secretary of Agriculture, for the amount of registration fees, the listed brands of lime products will be registered and a license issued permitting the sale of the brands so registered, for the calendar year. In cases where the composition of lime products is not known, and for the purpose of arriving at the proper guarantees to be given, as required for registrations and for labeling, special samples will be analyzed for residents of the State for a fee of one (\$1.00) dollar for each sample. Those wishing such analyses made should follow the directions outlined in the following paragraph.

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#### ANALYSES OF SPECIAL SAMPLES.

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For the purpose of aiding those desiring to arrive at proper guarantees for the registration and sale of Lime Products as well as to furnish information with respect to the composition of such materials, special samples will be analyzed for a fee of one (\$1.00) dollar as provided by the lime law, determinations being made for calcium and magnesium oxides, the equivalents calcium and magnesium carbonates estimated and for acid insoluble matter. Residents of Pennsylvania desiring to have such samples analyzed should proceed as follows:

*Amount of Sample:*—Where Lime Products are stored in bulk or bins portions should be carefully taken from as many different places as convenient and if in sacks portions should be drawn or selected from several different sacks, placed on a clean mixing cloth, table or floor, and carefully mixed to insure a uniform sample and as representative as possible of the entire lot or shipment. Approximately a 1 lb. sample should be selected by means of quartering and sub-dividing the mixture and placed in a suitable container, to be sent by express or parcel post.

*Charge for Analysis:*—A charge of one (\$1.00) dollar is made for each sample analyzed and this fee may be submitted in the form of check, money order, or cash and should be inclosed in a letter requesting the analysis to be made, and both sample and letter addressed as follows:

*Address:*—The sample and letter inclosing fee should be addressed to the Bureau of Chemistry, Pennsylvania Department of Agricul-

ture, Box 108, Harrisburg, Pa. The name of the sample or samples and the name of the sender should be plainly written on the package, or if more than one sample is submitted, a number, letter or name designating each should be included in order to avoid errors. As soon as possible after receipt of samples and fees, reports will be submitted to the sender showing the results secured, together with receipt for the amount of fees.

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#### REQUIRED LABELING.

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In addition to the information required to be shown in registration forms all sacks containing Lime Products, or attached cards, are required to be printed, or if sold in bulk a statement should be placed on the bins or delivered to the purchaser, showing the number of net pounds, the brand name, or name of product, name and address of Manufacturer, or Importer and the guaranteed analysis. The minimum guarantees are required for each class of lime products as follows:—

Pulverized limestone, ground oyster shells and artificial carbonate of lime: The minimum percentages contained of calcium oxide and its equivalent as calcium carbonate, of magnesium oxide and its equivalent as magnesium carbonate and the degree of fineness or the number of sieve-mesh through which the coarsest particles or all of the material will pass.

Lime or burned lime, either in lump or ground form, hydrated lime, slaked lime, spraying lime and marl: The minimum percentages contained of calcium oxide and magnesium oxide.

Gypsum or land plaster: The minimum percentages contained of calcium oxide and sulphur trioxide.

In order to more clearly illustrate the method of labeling, required for sacks or attached cards, or for cards to be attached to bins when sold in bulk, facsimile tags are included as follows:

For Ground Limestone, Ground Oyster Shells, and Artificial Carbonate of Lime.

100 lbs. Net.

**DAUPHIN PULVERIZED LIMESTONE**

Manufactured by

**DAUPHIN LIMESTONE CO.,**

Harrisburg, Pa.

Calcium Oxide, .....	50.00%
Calcium Carbonate Equivalent, .....	90.00%
Magnesium Oxide, .....	1.50%
Magnesium Carbonate Equivalent, .....	3.93%

Fineness—Sieve Mesh=No. 20.

For Lime, Hydrated and Slaked Lime and Marl.

100 lbs. Net.

**DAUPHIN HYDRATED LIME**

Manufactured by

**DAUPHIN LIME COMPANY,**

Harrisburg, Pa.

Calcium Oxide, .....	70.00%
Magnesium Oxide, .....	2.00%

**AVERAGE ANALYSES AND RETAIL PRICES.**

For the purpose of more clearly comparing the average compositions and retail selling prices of the six classes of Lime Products the results of analyses of samples of each class, together with the selling prices were averaged and tabulated as follows:

Compared with the averages estimated for the Lime Products analyzed during 1918 the average composition of the samples included in this report are as a rule higher, indicating that higher grades were sold during 1919. In the case of Pulverized Limestone the calcium oxide averaged higher and the magnesium oxide lower, while the average selling price was lower than reported for 1918. The Artificial Carbonates of Lime averaged slightly higher in calcium oxide and magnesium oxide and the average selling price was \$1.63 a ton higher. The 3 samples of Marl averaged about 1 per cent. higher in its oxide contents and averaged .58 cts. a ton less. Of the 85 samples of Hydrated Lime 55 were low in magnesia and 30 high in magnesia being of dolomite origin. These grades were averaged separately as will be noted. The low magnesia samples averaged 64.90 per cent. calcium oxide and 2.48 per cent. magnesium oxide. The calcium oxide averaged in excess of those for 1918 as would be expected as the samples of last year were not separated into the two grades in estimating the averages. The high magnesia samples averaged 51.30 per cent. calcium oxide and 24.23 per cent. magnesium oxide and the selling prices in both grades averaged practically the same or \$13.10 a ton, which was \$1.64 higher than the average price for last year. The 3 samples of Gypsum were also found to average higher in calcium oxide and sulphur trioxide while the selling price which was reported in only one case was \$12.00 a ton. In those cases where only a few samples are included in the estimated averages the results cannot be expected to fairly represent the Lime Products being offered for sale, however, the results shown will be of interest in comparing the compositions of the several Lime Products being sold in the State.

By making use of the average analyses and retail prices the amounts of calcium and magnesium oxides, the elements necessary in correcting soil acidity, supplied by each class of Lime Products, may be esti-

imated and these figures show the number of pounds of calcium oxide and magnesium oxide supplied for \$1.00 for each class of Lime Products were as follows:—

Pulverized Limestone, 142 lbs.; Artificial Carbonates of Lime, 101 lbs.; Marl, 108 lbs.; Lime, 150 lbs.; Hydrated Lime, low magnesia, 110 lbs.; high magnesia, 115 lbs.

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## DISCUSSION OF RESULTS OF INSPECTION.

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As already indicated the results of analyses of samples were tabulated in order that their composition might be readily compared. Those of like character being included in one table. The samples of Pulverized Limestone, Artificial Carbonate of Lime, and Marls being included in Table I. There were 14 brands and 56 samples of Pulverized Limestone which analyzed from 43.31 per cent. calcium oxide, equivalent to 77.26 per cent. calcium carbonate, to 55.34 per cent. calcium oxide, equivalent to 98.72 per cent. calcium carbonate, averaging 49.94 per cent. calcium oxide, equivalent to 89.09 per cent. calcium carbonate. The variations in magnesium oxide with the equivalents as magnesium carbonate were respectively from .36 per cent. equivalent to .75 per cent., to 9.85 equivalent to 20.60 per cent., averaging 1.89 equivalent to 3.95 per cent. The acid insoluble matter was found to be from .25 to 13.38 per cent. and averaged 6.34 per cent. The determinations for the degrees of fineness indicated that they were sufficiently pulverized so that the coarsest particles could on an average pass a No. 15 mesh sieve, varying in fineness from that passing a No. 10 mesh sieve to a No. 40 mesh sieve. There were 2 samples of one brand excluded in estimating the average composition as they were limestones of dolomite origin being guaranteed 26.56 per cent. calcium oxide and 19.48 per cent. magnesium oxide, these guarantees being excluded upon analysis. There were 13 samples in which the contents of calcium oxide were found to be less than the guarantees most of these being more than 1 per cent. deficient while in certain brands as will be noted the guarantees were considerably lower than justified by the composition found upon analysis. The retail selling prices were from \$5.00, in a sample analyzing 55.30 calcium oxide and .58 magnesium oxide, to \$14.00 in 1 containing 49.16 per cent. calcium oxide and 1.85 per cent. magnesium oxide and averaged \$7.29 per ton.

The 18 samples representing 4 brands of Artificial Carbonate of Lime varied in their composition from 46.96 to 54.58 per cent. averaging 51.33 per cent. calcium oxide being equivalent to 83.77, 97.37 and

91.57 per cent. calcium carbonate, respectively. The percentages of magnesium oxide found were from 0.66 to 5.69, averaging 2.43 per cent. being equivalent as magnesium carbonate to from 1.38 to 11.90 per cent., averaging 5.08 per cent. respectively. Two samples of this class of Lime Products were also excluded in estimating the average results as will be noted because they were found to contain 3.10 per cent. and 45.15 per cent. of moisture, thus causing their contents of calcium and magnesium oxides to be less than normally found present in samples of Artificial Carbonate of Lime. The determinations for acid insoluble matter showed variations of from .08 to 3.97 per cent., averaging .87 per cent. The determinations for the degree of fineness indicated that the coarsest particles would upon an average pass a No. 20 mesh sieve varying in fineness from that which would pass a No. 5 to a No. 50 mesh sieve. Seven of these samples were found to be low in calcium oxide compared with their guarantees 3 being in excess of 1 per cent. deficient. The retail selling prices were from \$7.00 to \$13.50, and averaged \$10.64 a ton.

The 3 samples of Marl including 2 brands were found upon analysis to contain from 45.26 to 50.10 per cent., averaging 47.28 per cent. calcium oxide, being equivalent to calcium carbonate of from 80.74 to 89.37 per cent., averaging 84.34 per cent. respectively and the magnesium oxide showed but slight variations of from 0.40 to 0.94, averaging 0.72 per cent. being equivalent as magnesium carbonate to 0.84, 1.97 and averaging 1.51 per cent. respectively. The acid insoluble matter was from 3.10 to 6.35 per cent. and averaged 5.09 per cent. and the selling prices reported were from \$6.00 to \$13.00 and averaged \$8.92 a ton. Each of these samples were found upon analysis to exceed the guarantees claimed.

The results of analyses of the samples of Lime and Hydrated Lime will be found in Table II. There were 15 samples of Lime, the product obtained by burning limestone, representing 12 different brands. They were found upon analysis to vary from 50.61 per cent. to 90.93 per cent., averaging 69.42 per cent. calcium oxide and from 0.76 to 5.17 averaging 2.44 per cent. magnesium oxide. There was considerable variation found in the amounts of acid insoluble matter contained in the samples of burned lime ranging from none to 25.88 per cent., averaging 9.05 per cent. The sample showing no insoluble matter analyzed 90.61 per cent. calcium oxide and .76 per cent. magnesium oxide while that showing the highest content of acid insoluble matter was found below its guarantee and contained 50.61 per cent. calcium oxide and 2.75 per cent. magnesium oxide. The guarantees for calcium oxide in this grade of products were from 50 to 90 per cent. and 9 samples or 60 per cent. of them were found to be materially below the claims made as well be noted. Determinations were also made

for carbon dioxide which indicates the amount of unburned limestone or "Core" remaining, and shows the extent to which the limestone has been subjected in the process of calcining. The determination for carbon dioxide showed variations of from .53 to 20.18 per cent. averaging 4.61 per cent. and estimated as calcium carbonate showed that the per cent. of unburned limestone or core remaining in these samples varied from 1.21 to 45.92 and averaged 10.49 per cent. The retail selling prices were from \$5.50 to \$13.50 and averaged \$9.60 a ton.

The samples of Hydrated Lime received and analyzed during the year numbered 85, including 32 different brands, and as this class was represented by the largest number of samples it might be inferred that this form of Lime Products is used more extensively than the other grades. In order to better compare the results of analyses of these products they were divided into 2 sub-classes or groups, namely; those low in magnesia and those high in magnesia or of dolomite origin or high magnesian Hydrated Limes. There were 55 samples of the low magnesian group which were found upon analysis to contain from 48.32 to 75.48 per cent., averaging 64.90 per cent. calcium oxide and from .43 to 7.89, averaging 2.48 per cent. magnesium oxide. The insoluble matter varied from .07 to 15.30 and averaged 3.62 per cent. In the 30 samples of high magnesian Hydrated Limes the calcium oxide varied from 40.83 to 61.61, averaging 51.30 per cent. and the magnesium oxide from 10.14 to 32.26, averaging 24.23 per cent. The insoluble matter in this group varied from .45 to 3.25, averaging 1.67 per cent. A large proportion of the samples were found upon analysis to fall below their guarantee in calcium oxide, 29 being 1 per cent. or more deficient, and 4 samples slightly less than claimed. In a number of cases as will be noted, where the calcium oxide was low the magnesium oxide exceeded the guarantees, thus in a measure balancing the deficiencies. The retail selling prices were higher for this class of lime products than the others, and varied from \$9.65 to \$16.00, and averaged \$13.10 a ton.

Three samples of Gypsum or Land Plaster, including 2 brands, were received during the year, which analyzed from 30.10 to 38.62 per cent., averaging 35.59 per cent. calcium oxide, and from 41.36 to 47.09 per cent., averaging 43.63 per cent. sulphur trioxide. Estimating these figures as calcium sulphate or gypsum shows that they contained from 70.35 to 80.10, averaging 74.31 per cent. of calcium sulphate. The insoluble matter varied from 1.05 to 4.10, averaging 2.14 per cent., and the selling price, which was only received in 1 case, was \$12.00 a ton.

The lime products received and classified as Miscellaneous as shown in Table IV, included 2 samples of a brand of "Agricultural Lime Tailings," and 5 samples of "Berkeley Hydra Calcite Lime." The for-

mer brand averaged 62.79 per cent. calcium oxide, 4.24 per cent. magnesium oxide, 3.86 per cent. insoluble matter and sold for the average price of \$12.75 a ton. The analyses of the samples of the latter brand averaged 59.34 per cent. calcium oxide, 2.37 per cent. magnesium oxide, .89 per cent. insoluble matter and had an average selling price of \$10.88 a ton.

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### LIME FACTORS.

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In estimating the composition of the several classes of lime products, it is necessary to employ certain factors, which are derived from the chemical formulas representing them. As previously shown determinations are made for calcium oxide, magnesium oxide, carbon dioxide and sulphur trioxide. Carbonate of Lime is represented by the formula  $\text{CaCO}_3$ , Carbonate of Magnesia by  $\text{MgCO}_3$ , Gypsum or Calcium Sulphate by  $\text{CaSO}_4$ , Hydrated Lime by  $\text{Ca(OH)}_2$ , and Magnesium Hydrate by  $\text{Mg(OH)}_2$ . To estimate the amounts of these forms or combinations the percentages of Calcium Oxide and Magnesium Oxide secured are multiplied by their respective factors. In order that these factors may be at hand for reference, they are included herewith as follows:—

Given.	Required.	Factor.
Calcium oxide, .....	Calcium hydrate, .....	1.321
Calcium oxide, .....	Calcium carbonate, .....	1.7839
Calcium oxide, .....	Calcium sulphate, .....	2.4265
Calcium hydrate, .....	Calcium oxide, .....	.7570
Calcium carbonate, .....	Calcium oxide, .....	.5606
Calcium sulphate, .....	Calcium oxide, .....	.4121
Magnesium oxide, .....	Magnesium hydrate, .....	1.4468
Magnesium oxide, .....	Magnesium carbonate, .....	2.0913
Magnesium hydrate, .....	Magnesium oxide, .....	.6912
Magnesium carbonate, .....	Magnesium oxide, .....	.4782
Calcium oxide, .....	Sulphur trioxide, .....	1.4265
Carbon dioxide, .....	Calcium carbonate, .....	2.2757
Carbon dioxide, .....	Magnesium carbonate, .....	1.9159
Calcium carbonate, .....	Carbon dioxide, .....	.4394
Sulphur trioxide, .....	Calcium sulphate, .....	1.701

TABLE I.—PULVERIZED LIMESTONE.

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Moisture	%
	PULVERIZED LIMESTONE.			%
	BESSEMER LIMESTONE CO., YOUNGSTOWN, OHIO.			
C-691	Bessemer Pulverized Limestone, -----	J. H. Brooks, Beaver Falls, -----		0.17
C-640	Bessemer Pulverized Limestone, -----	S. Leroy Trittle, Franklin, -----		0.15
C-690	Bessemer Pulverized Limestone, -----	T. T. Yarian, Mercer, -----		0.50
	CARBON LIMESTONE CO., YOUNGSTOWN, OHIO.			
C-655	Carbon Agricultural Ground Limestone, -----	Wm. G. Hubbard, Sandy Lake, -----		0.17
C-571	Carbon Agricultural Ground Limestone, -----	S. N. Moore, Echo, -----		0.20
C-703	Carbon Agricultural Ground Limestone, -----	David Spangler, Coleman, -----		0.00
C-688	Carbon Agricultural Ground Limestone, -----	John Whighting, New Bedford, -----		0.20
C-694	Carbon Agricultural Ground Limestone, -----	At Plant, Hillsville, -----		0.10
C-695	Carbon Agricultural Ground Limestone, -----	At Plant, Hillsville, -----		0.08
C-696	Carbon Agricultural Ground Limestone, -----	At Plant, Hillsville, -----		0.10
	CENTRE COUNTY LIME CO., BELLE FONTE, PA.			
C-725	Agricultural Ground Limestone, -----	E. M. Fullington Sons, Clearfield, -----		0.15
	F. E. CONLEY STONE CO., UTICA, N. Y.			
C-697	Raw Ground Lime, -----	F. C. Deveny, Forest City, -----		0.10
	EDISON PULVERIZED LIMESTONE CO., STEWARTSVILLE, N. J.			
C-530	Edison Pulverized Limestone, -----	Adolph Boettigner, Danville, -----		0.05
C-554	Edison Pulverized Limestone, -----	G. R. Clark, Scranton, -----		0.08
C-551	Edison Pulverized Limestone, -----	B. E. & J. T. Cokely, Scranton, -----		0.00
C-598	Edison Pulverized Limestone, -----	George Fields, Hamilton, -----		0.13
C-610	Edison Pulverized Limestone, -----	R. E. Mason, Hatboro, -----		0.11
C-553	Edison Pulverized Limestone, -----	E. P. Matthews & Son's Mill, Moscow, -----		0.09
C-669	Edison Pulverized Limestone, -----	Fred Mick, Cresco, -----		0.15
C-599	Edison Pulverized Limestone, -----	L. H. Miller, Greentown, -----		0.25
C-593	Edison Pulverized Limestone, -----	Murray Co., Honesdale, -----		0.17
C-671	Edison Pulverized Limestone, -----	B. Pallman, Dalton, -----		0.07
C-613	Edison Pulverized Limestone, -----	H. Z. Pride & Son, Westfield, -----		0.17
C-600	Edison Pulverized Limestone, -----	C. F. Seig, Panther, -----		0.20
C-547	Edison Pulverized Limestone, -----	Amos Snyder, Hegins, -----		0.31
C-731	Edison Pulverized Limestone, -----	F. L. Stipp, Wimmers, -----		0.12
	THE FRANKLIN MANUFACTURING CO., FRANKLIN, PA.			
C-693	Franklin Brand, -----	Franklin Manufacturing Co., Franklin, -----		1.00
	G. W. JOHNSON LIMESTONE CO., NEW CASTLE, PA.			
C-652	Johnson's Pulverized Limestone, -----	John Abbott, Sugar Grove, -----		0.00
C-643	Johnson's Pulverized Limestone, -----	Charles King, Cooperstown, -----		0.13
C-676	Johnson's Pulverized Limestone, -----	S. N. Moore, Echo, -----		0.12
C-572	Johnson's Pulverized Limestone, -----	Morrow & Buxton, Valencia, -----		0.13
C-689	Johnson's Pulverized Limestone, -----	L. J. Overlander, Racine, -----		0.12
	THE KELLEY ISLAND LIME AND TRANSPORT CO., CLEVELAND, O.			
C-617	Tiger Brand Agricultural Ground Limestone (Marblehead).	Dietz & Mooney, Clarion, -----		0.05
C-721	Tiger Brand Agricultural Ground Limestone (Marblehead).	Dietz & Mooney, Clarion, -----		0.00

## ARTIFICIAL CARBONATE OF LIME AND MARL.

Calcium Oxide.	Calcium Carbonate.	Magnesium Oxide.	Magnesium Carbonate.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Insoluble matter.	Fineness.			Selling price per ton at place of selection.	Chemist's number.	
											Coarsest Particles Pass Sieve Mesh No.—	Amount of Sample Passing Sieve Meshes.	10 mesh.	50 mesh.	100 mesh.	
%	%	%	%	%	%	%	%	%	No.	No.	%	%	%	%	%	
49.78	36.00	88.80	-----	0.54	0.54	1.13	-----	9.00	20	10	100.0	84.8	71.9	6 00	C- 691	
48.06	36.00	85.73	-----	0.76	0.54	1.59	-----	11.71	10	10	100.0	83.2	70.6	6 75	C- 640	
45.84	36.00	81.77	-----	1.01	0.54	2.11	-----	13.38	20	10	100.0	84.9	73.1	5 50	C- 690	
48.20	34.50	85.98	-----	0.97	0.45	2.03	-----	10.04	10	10	100.0	86.2	73.8	6 15	C- 655	
47.11	34.50	84.04	-----	0.86	0.44	1.80	-----	11.76	10	10	100.0	92.4	80.9	6 00	C- 571	
48.93	34.50	87.29	-----	0.91	0.44	1.90	-----	9.65	10	10	100.0	93.8	81.4	5 50	C- 703	
49.16	34.50	87.70	-----	0.63	0.44	1.32	-----	8.95	20	10	100.0	96.5	84.8	5 15	C- 688	
51.39	34.50	91.67	-----	0.40	0.44	0.84	-----	5.75	20	10	100.0	98.2	86.7	-----	C- 694	
52.03	34.50	92.82	-----	0.36	0.44	0.75	-----	4.65	10	10	100.0	91.6	76.9	-----	C- 695	
52.87	34.50	94.31	-----	0.58	0.44	1.21	-----	4.40	10	10	100.0	92.1	76.4	-----	C- 696	
51.38	50.50	91.66	90.00	1.81	1.46	3.79	2.50	5.95	10	20	100.0	47.8	33.0	7 00	C- 725	
48.82	51.50	87.09	95.50	3.11	1.30	6.50	2.30	6.30	10	10	100.0	47.0	35.4	6 50	C- 697	
48.76	48.50	86.98	90.00	2.33	1.90	4.87	3.00	8.59	20	10	100.0	97.5	97.6	6 25	C- 530	
49.14	50.00	87.66	90.00	1.46	3.05	3.00	9.55	20	10	100.0	98.0	91.1	10 00	C- 554		
46.36	50.00	83.59	90.00	2.32	4.85	3.00	11.45	10	10	100.0	94.0	87.0	13 00	C- 551		
49.59	48.50	88.46	90.00	1.78	1.99	3.72	3.00	6.33	20	10	100.0	97.9	92.0	6 25	C- 598	
46.42	48.50	82.81	90.00	2.08	1.90	4.35	3.00	11.00	20	10	100.0	97.2	88.5	9 00	C- 610	
48.00	50.00	85.63	90.00	2.71	5.67	3.00	9.50	20	10	100.0	98.2	92.6	10 00	C- 553		
46.44	48.50	82.84	86.52	2.20	1.90	4.60	3.97	11.65	20	10	100.0	98.9	92.0	14 00	C- 669	
46.74	48.50	83.38	90.00	2.01	1.90	4.20	3.00	10.70	20	10	100.0	97.6	89.2	6 25	C- 599	
47.90	50.00	85.45	90.00	2.64	3.00	5.52	3.00	9.05	20	10	100.0	96.3	90.4	6 90	C- 593	
49.16	48.50	87.70	88.52	1.85	1.90	3.87	3.97	7.90	20	10	100.0	98.0	91.6	14 00	C- 671	
48.34	48.50	86.23	90.00	2.69	1.90	5.63	3.00	6.73	20	10	100.0	97.8	92.2	10 00	C- 613	
47.21	48.50	84.22	90.00	2.06	1.90	4.31	3.00	10.31	20	10	100.0	97.8	90.0	7 60	C- 600	
47.32	50.00	84.41	90.00	2.51	5.25	3.00	9.63	20	10	100.0	96.4	92.0	8 25	C- 547		
49.68	48.50	88.62	86.52	1.59	1.90	3.33	3.97	8.10	40	10	100.0	99.5	94.3	8 00	C- 731	
49.15	46.00	88.27	-----	4.71	2.00	9.85	-----	0.25	10	10	100.0	68.5	52.5	6 00	C- 693	
54.60	47.60	97.56	85.00	0.58	0.70	1.21	1.50	0.30	10	20	100.0	64.5	51.6	8 00	C- 652	
49.26	47.60	87.87	85.00	0.76	0.70	1.59	1.50	9.87	10	20	100.0	91.2	77.1	-----	C- 643	
54.26	47.60	96.79	85.00	0.91	0.70	1.90	1.53	2.15	20	20	100.0	99.1	82.5	6 00	C- 676	
48.39	47.60	86.32	85.00	0.69	0.70	1.44	1.50	9.88	20	20	100.0	91.9	78.5	6 75	C- 572	
50.43	47.60	89.96	85.00	0.54	0.70	1.13	1.50	6.70	10	20	100.0	92.3	76.3	6 25	C- 689	
44.67	44.80	79.69	-----	9.04	6.20	18.91	-----	2.54	10	10	100.0	74.3	65.7	10 00	C- 617	
43.31	44.80	77.26	-----	9.85	6.20	20.60	-----	2.40	10	10	100.0	73.4	64.4	10 00	C- 721	

TABLE I.—PULVERIZED LIMESTONE, ARTIFICIAL

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Moisture.	%	
	LEHIGH PULVERIZED LIMESTONE CO., ALLENTOWN, PA.				
C- 549	Lehigh Pulverized Limestone, -----	W. H. Stout, Pine Grove, -----		*0.19	
C- 685	Lehigh Pulverized Limestone, -----	W. H. Stout, Pine Grove, -----		*0.05	
	MICHIGAN LIMESTONE & CHEMICAL CO., INC., BUFFALO, N. Y.				
C- 739	Calcite Brand Michigan Limestone, -----	Corry Milling & Supply Co., Inc., Corry.		0.12	
C- 631	Calcite Brand Michigan Limestone, -----	Charles Drake, Athens, -----		0.19	
C- 611	Calcite Brand Michigan Limestone, -----	B. F. Edwards, Welsboro, -----		0.05	
C- 623	Calcite Brand Michigan Limestone, -----	E. M. Fullington's Sons, Clearfield, -----		0.11	
C- 719	Calcite Brand Michigan Limestone, -----	Wm. Krause, Dallas, -----		0.05	
C- 700	Calcite Brand Michigan Limestone, -----	W. B. Lecte, Ulysses, -----		0.10	
C- 735	Calcite Brand Michigan Limestone, -----	Archie Mellon, Conneaut Lake, -----		0.00	
C- 641	Calcite Brand Michigan Limestone, -----	S. Leroy Tritt, Franklin, -----		0.10	
C- 737	Calcite Brand Michigan Limestone, -----	S. Leroy Tritt, Franklin, -----		0.12	
	NEW CASTLE LIME AND STONE CO., NEW CASTLE, PA.				
C- 649	New Castle Brand Raw Pulverized Lime-stone.	J. G. Cover, Masontown, -----		0.27	
C- 657	New Castle Brand Raw Pulverized Lime-stone.	Seymour Hood, Cambridge Springs, -----		0.17	
C- 616	New Castle Brand Raw Pulverized Lime-stone.	J. Frank Powell, New Castle, -----		0.25	
	PALMER LIME AND CEMENT CO., NEW YORK, N. Y.				
C- 607	Ground Limestone, -----	E. A. & J. L. Pennock, Chatham, -----		0.21	
	THE SOLVAY PROCESS CO., SYRA-CUSE, N. Y.				
C- 591	Solvay Pulverized Limestone, -----	L. G. Colvin, Dalton, -----		0.19	
C- 670	Solvay Pulverized Limestone, -----	D. Miller, Ronson, -----		0.20	
C- 672	Solvay Pulverized Limestone, -----	J. Miller, Clark Summit, -----		0.15	
C- 555	Solvay Pulverized Limestone, -----	A. E. Seamans, Factoryville, -----		0.22	
C- 590	Solvay Pulverized Limestone, -----	G. A. Spencer, Waverly, -----		0.13	
C- 732	Solvay Pulverized Limestone, -----	St. Joseph's Place, Mt. Cobb, -----		0.12	
	THE STANDARD LIME AND STONE CO., BALTIMORE, MD.				
C- 709	Standard Finely Pulverized Limestone, -----	Sheehan Bros., Landenburg, -----		0.01	
	ARTIFICIAL CARBONATE OF LIME.	Average, -----		0.14	
	THE COLUMBIA PRODUCTS CO., CLEVELAND, OHIO.				
C- 646	Plant Lime, -----	J. E. Berkheimer, Marianna, -----		1.32	
C- 533	Plant Lime, -----	H. F. Gelbach, Evans City, -----		1.16	
C- 594	Plant Lime, -----	Gibson & Clark Co., Indiana, -----		0.25	
C- 659	Plant Lime, -----	Gibson & Clark Co., Indiana, -----		0.87	
C- 573	Plant Lime, -----	Mars Milling & Feed Co., Mars, -----		0.35	
C- 734	Plant Lime, -----	F. E. Moulthrop, Conneautville, -----		0.87	
C- 644	Plant Lime, -----	Oil City Wood Working Co., Oil City.		0.47	

## CARBONATE OF LIME AND MARL—Continued.

Found.	Guaranteed.		Found.		Guaranteed.		Found.		Guaranteed.		Insoluble matter.		Fineness.			Selling price per ton at place of selection.	Chemist's number.
	Cal. Oxide.	Cal. Carbonate.	Magn. Oxide.	Magn. Carbonate.	Cal. Oxide.	Cal. Carbonate.	Magn. Oxide.	Magn. Carbonate.	Cal. Oxide.	Cal. Carbonate.	Magn. Oxide.	Magn. Carbonate.	Coarsest Particles Pass Sieve Mesh No.	Amount of Sample Passing Sieve Meshes.			
28.90*	26.56	51.55*	47.48	19.84*	19.48	41.49*	40.75	9.07*	20	100.0	81.5	66.9	6.25	C- 549			
29.05*	26.56	51.82*	47.43	19.12*	19.48	39.99*	40.75	7.90*	20	100.0	92.7	88.3	6.50	C- 685			
54.69	54.50	97.56	97.00	0.65	1.00	1.36	2.00	0.55	10	16	100.0	69.7	57.1	6.00	C- 739		
54.63	54.50	97.45	97.00	0.67	1.00	1.40	2.00	0.47	10	16	100.0	68.3	54.6		C- 631		
55.34	54.50	98.72	97.00	0.65	1.00	1.36	2.00	0.48	10	16	100.0	68.2	56.0	7.25	C- 611		
55.30	54.50	98.65	97.00	0.58	1.00	1.21	2.00	0.37	10	16	100.0	71.5	57.2	5.00	C- 623		
54.64	54.50	97.47	97.00	0.51	1.00	1.07	2.00	0.38	10	16	100.0	68.2	55.4	7.50	C- 719		
55.11	54.50	98.31	97.00	0.51	1.00	1.07	2.00	0.65	10	16	100.0	68.3	55.9	7.00	C- 700		
54.64	54.50	97.47	97.00	0.72	1.00	1.51	2.00	0.30	10	16	100.0	71.3	58.8		C- 735		
55.02	54.50	98.15	97.00	0.67	1.00	1.40	2.00	0.70	10	16	100.0	69.3	56.8	5.25	C- 641		
54.97	54.50	98.06	97.00	0.72	1.00	1.51	2.00	0.45	10	16	100.0	68.4	55.9		C- 737		
48.11	46.75	85.82	85.00	0.83	0.70	1.74	1.40	10.54	10	10	100.0	91.4	75.8	8.00	C- 649		
49.19	46.75	87.75	85.00	0.82	0.70	1.71	1.40	8.62	10	10	100.0	89.8	72.2	6.25	C- 657		
47.19	46.75	84.18	85.00	0.76	0.70	1.59	1.40	11.42	10	10	100.0	92.4	78.0	8.00	C- 616		
45.12	48.00	80.49	-----	8.82	4.00	18.45	-----	2.49	10	20	100.0	73.6	61.8	8.00	C- 607		
50.38	50.40	89.87	-----	2.46	1.50	5.14	-----	5.75	10	20	100.0	77.6	62.8	5.25	C- 591		
47.40	50.40	84.56	-----	2.72	1.50	5.69	-----	8.50	20	20	100.0	86.0	76.6	6.25	C- 670		
49.00	50.40	87.41	-----	2.46	1.50	5.14	-----	6.75	20	20	100.0	85.2	66.0	5.19	C- 672		
51.38	50.40	91.66	-----	2.48	1.50	5.19	-----	5.50	20	20	100.0	87.6	69.2	5.25	C- 555		
50.48	50.40	90.05	-----	2.39	1.50	5.00	-----	5.78	20	20	100.0	87.0	74.4	5.25	C- 590		
49.65	50.40	88.57	-----	2.72	1.50	5.69	-----	5.35	20	20	100.0	81.1	66.2	5.25	C- 732		
55.22	50.40	98.51	90.00	0.54	trace	1.13	-----	1.35	20	20	100.0	55.4	38.2	6.50	C- 709		
49.94	-----	89.09	-----	1.89	-----	3.95	-----	6.34	15	-----	100.0	84.2	72.8	\$7.29	-----		
46.96	45.00	83.77	-----	4.34	5.00	9.08	-----	1.63	10	10	100.0	69.3	61.0	\$10.00	C- 646		
47.09	45.00	84.00	-----	4.62	5.00	9.66	-----	1.43	10	10	100.0	70.3	60.0	10.00	C- 533		
50.08	45.00	89.34	-----	3.84	5.00	8.03	-----	1.24	10	10	100.0	67.5	60.7	10.00	C- 594		
49.04	45.00	87.48	-----	4.09	5.00	8.55	-----	1.55	10	10	100.0	73.7	65.2	10.00	C- 658		
48.96	45.00	87.34	-----	4.12	5.00	8.62	-----	0.81	10	10	100.0	74.7	67.6	10.00	C- 573		
49.04	45.00	87.48	-----	5.69	5.00	11.90	-----	0.30	10	10	100.0	85.3	81.2	10.00	C- 734		
49.04	45.00	87.48	-----	3.73	5.00	7.80	-----	0.83	10	10	100.0	65.2	58.0	10.50	C- 644		

\*Excluded from average.

TABLE I.—PULVERIZED LIMESTONE, ARTIFICIAL

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Moisture.	
			%	%
	INDUSTRIAL CHEMICAL CO., NEW YORK, N. Y.			
C- 577	I. C. Co. Precipitated Agricultural Lime,	Alfred Baver, Kutztown, -----	0.14	
C- 559	I. C. Co. Precipitated Agricultural Lime,	H. F. Gump, Everett, -----	0.26	
C- 588	I. C. Co. Precipitated Agricultural Lime,	J. Harvey Miller, Ligonier, -----	0.32	
C- 575	I. C. Co. Precipitated Agricultural Lime,	E. A. Slagle, Paxinos, -----	0.76	
C- 716	I. C. Co. Precipitated Agricultural Lime,	R. J. Toepfer, Tarentum, -----	0.30	
C- 595	I. C. Co. Precipitated Agricultural Lime,	I. G. Williams, Ariel, -----	0.45	
C- 596	I. C. Co. Precipitated Agricultural Lime,	I. G. Williams, Ariel, -----	*3.10	
C- 597	I. C. Co. Precipitated Agricultural Lime.	I. G. Williams, Ariel, -----	0.79	
	MELVILLE-CORBETT CO., ST. MARYS, PA.			
C- 658	Lime for the Farm, -----	Peffer & Son, Punxsutawney, -----	*45.15	
	NEW YORK AND PENNSYLVANIA CO., JOHNSONBURG, PA.			
C- 660	Nypen Agricultural Carbonate of Lime,--	Gibson & Clark Co., Indiana, -----	0.40	
C- 720	Nypen Agricultural Carbonate of Lime,--	J. P. Jones Hardware Co., Sommerville, -----	0.40	
	MARL.	Average, -----	0.56	
	CONNEAUT LAKE MARL CO., HARMONSBURG, PA.			
C- 733	Conneaut Marl-Lime, -----	Conneaut Lake Marl Co., Harmonsburg, -----	2.20	
C- 531	Conneaut Marl-Lime, -----	H. J. Kiingler & Co., Butler, -----	3.34	
	NATURAL LIME-MARL CO., CHARLES TOWN, W. VA.			
C- 705	Lime-Marl, -----	Mr. Harpster, Williamsburg, -----	4.15	
		Average, -----	3.23	

## CARBONATE OF LIME AND MARL—Concluded.

Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Insoluble matter.	Fineness.				Selling price per ton at place of selection.	Chemist's number.	
									Coarsest Particles Pass Sieve Mesh No.—	Amount of Sample Passing Sieve Meshes.	10 mesh.	50 mesh.	100 mesh.		
%	%	%	%	%	%	%	%	%	No.	No.	%	%	%	\$	
54.58	54.60	97.37	97.50	0.66	0.58	1.38	1.22	0.08	20	100.0	95.4	93.8	12 25	C- 577	
53.98	54.60	96.29	97.50	0.87	0.58	1.82	1.22	0.19	30	100.0	98.8	98.3	13 50	C- 559	
53.81	54.60	95.99	97.50	0.95	0.58	1.99	1.22	0.50	30	100.0	99.8	99.8	13 00	C- 588	
53.48	54.60	95.40	97.50	0.91	0.58	1.90	1.22	0.31	10	100.0	74.9	69.0	12 00	C- 575	
53.94	54.60	96.22	97.50	0.69	0.58	1.44	1.22	0.45	50	100.0	100.0	99.3	12 00	C- 716	
53.81	54.60	95.99	97.50	0.86	0.58	1.80	1.22	0.13	30	100.0	99.9	99.8	7 00	C- 595	
35.39*	54.60	63.13*	97.50	1.35*	0.58	2.82*	1.22	19.30*	10*	100.0*	42.0*	12.0*	*7 00	C- 596	
49.48	54.60	88.26	97.50	1.64	0.58	3.43	1.22	3.97	5	98.2	65.9	48.2	7 00	C- 597	
29.10*	51.91*	-----	0.70*	-----	1.46*	-----	0.70*	-----	-----	-----	-----	-----	*5 00	C- 658	
54.50	53.50	97.22	95.50	1.04	0.75	2.17	1.57	0.25	50	20	100.0	100.0	99.9	12 00	C- 660
53.51	53.50	95.46	95.50	0.80	0.75	1.67	1.57	0.35	30	20	100.0	98.1	95.6	11 00	C- 720
51.33	91.57	-----	2.43	-----	5.08	-----	0.87	20	-----	99.9	83.7	78.5	\$10 64	-----	
46.48	44.00	82.92	-----	0.94	0.05	1.97	-----	6.35	-----	-----	-----	-----	\$6 00	C- 733	
45.26	44.00	80.74	-----	0.82	0.05	1.71	-----	5.84	-----	-----	-----	-----	13 00	C- 531	
50.10	50.00	89.37	90.00	0.40	-----	0.84	-----	3.10	-----	-----	-----	-----	7 75	C- 705	
47.28	-----	84.34	-----	0.72	-----	1.51	-----	5.09	-----	-----	-----	-----	\$8 92	-----	

\*Excluded from average.

TABLE II.—LIME

Chemist's number.	Name of Manufacturer and Brand	Sample Taken From—
	LIME.	
	S. W. BARRICK & SONS, WOODSBORO, MD.	
C- 662	Barricks High Grade Agricultural Lime,	John F. Kelley, New London, -----
	HARRY BOCH, BEDFORD, PA. Ground Burnt Lime,	Harry Boch, Bedford, -----
	CENTRE COUNTY LIME CO., BELLEFONTE, PA.	
C- 621	Agricultural Lime in Bulk,	Peffer & Son, Punxsutawney, -----
C- 724	Agricultural Lime in Bulk,	Peffer & Son, Punxsutawney, -----
C- 701	Agricultural Lime in Bulk,	Henry W. Shoemaker, McElhattan, -----
	CLIMAX LIME AND STONE CO., WICK, PA.	
C- 639	Lump Lime,	William Hindman, Mercer, -----
	LUTHER KELLAR, SCRANTON, PA. Kellar Lump Agricultural Lime,	George Fielding, South Canaan, -----
C- 592	Kellar Lump Agricultural Lime,	Roy Storms, Moscow, -----
C- 552		
	KEYSTONE LIME AND COAL CO., ELK LICK, PA.	
C- 710	Alfalfa Brand Granulated Lime,	J. A. Erdley, Middleburg, -----
	HENRY KILGUS, MUNCY, PA. Muncy Lump Lime,	N. J. Norton, New Albany, -----
	M. E. McNEAL & SONS, OSTERBURG, PA.	
C- 682	Ground Lime,	M. E. McNeal & Sons, Osterburg, -----
C- 583	Lime,	M. E. McNeal & Sons, Osterburg, -----
	QUARRYVILLE STONE AND LIME CO., QUARRYVILLE, PA.	
C- 528	Quarryville Lime,	A. H. Burkholder, Quarryville, -----
	ROSE POINT STONE AND LIME CO., NEW CASTLE, PA.	
C- 614	Rose Point Ground Burned Lime,	Steavens & Atkinson, Coudersport, -----
	WHITEROCK QUARRIES, BELLEFONTE, PA.	
C- 622	Agricultural Lump Lime,	E. M. Fullington's Sons, Clearfield, -----
	HYDRATED LIME. (Low Magnesia.)	Average, -----
	THE AGRICULTURAL AND COMMERCIAL LIME CO., CANTON, OHIO. Cerealime-Hydrate,	George B. Sprowl, Claysville, -----
	AMERICAN LIME AND STONE CO., TYRONE, PA.	
C- 612	Hydra-Oxide (H-O) of Lime for Agricultural Use.	John Alexander, Liberty, -----
C- 639	Hydra-Oxide (H-O) of Lime for Agricultural Use.	Farmers and Consumers Commercial Union, Troy.
C- 702	Hydra-Oxide (H-O) of Lime for Agricultural Use.	E. W. Hyman, Jersey Shore, -----
C- 713	Hydra-Oxide (H-O) of Lime for Agricultural Use.	Herman Keebler, Montoursville, -----

## AND HYDRATED LIME.

Calcium Oxide.		Magnesium Oxide.		Carbon dioxide.		Insoluble matter.		Selling price per ton at place of selection.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.						
%	%	%	%	%	%	%	\$		
66.45	90.00	5.14	2.00	4.82	8.56	12.95		C- 602	
54.49	65.00	2.85	3.00	20.18	7.50	8.40		C- 681	
84.85 90.93 90.61	85.00 85.00 85.00	3.29 1.30 0.76	1.50 1.50 1.50	1.02 0.58 0.53	2.70 0.05 0.00	11.00 11.00 8.81		C- 621 C- 724 C- 701	
70.58	85.00	1.22	0.80	6.19	6.52	7.50		C- 639	
53.10 66.42	53.00 53.00	2.66 3.04	3.00 3.00	7.51 0.97	10.67 11.82	8.50 7.50		C- 592 C- 552	
63.53	73.50	3.15	1.50	9.90	3.60	13.50		C- 710	
70.67	75.25	1.01	1.57	8.30	9.95	7.25		C- 535	
61.96 50.61	78.00 78.00	3.05 2.75	2.00 2.00	2.58 0.76	12.62 25.88	7.00 5.50		C- 682 C- 683	
65.42	50-60	3.87	2-8	0.93	23.28	11.00		C- 528	
65.52	75.00	1.15	1.00	3.56	10.96	12.00		C- 614	
86.16	90.00	1.33	1.50	1.20	2.25	12.10		C- 622	
69.42		2.44		4.61	9.05	\$9.60			
59.53	60.00	1.64	1.50		4.43	\$11.50		C- 648	
64.82	65.00	2.59			5.78	13.25		C- 612	
67.06	65.00	1.67			3.54	13.50		C- 539	
67.37	65.00	1.27	1.00		2.25	12.30		C- 702	
67.05	65.00	1.56	1.00		3.35	13.25		C- 713	

TABLE II.—LIME AND

Chemist's number.	Name of Manufacturer and Brand	Sample Taken From—
C- 625	Hydra-Oxide (H-O) of Lime for Agricultural Use.	A. S. Kelly, Ebensburg, -----
C- 674	Hydra-Oxide (H-O) of Lime for Agricultural Use.	G. W. Martin & Co., Saltsburg, -----
C- 620	Hydra-Oxide (H-O) of Lime for Agricultural Use.	Peffer & Son, Punxsutawney, -----
C- 653	Hydra-Oxide (H-O) of Lime for Agricultural Use.	J. A. Stinbiser, Kersey, -----
	S. W. BARRICK & SONS, WOODSBORO, MD.	
C- 663	Barricks Hydrated Lime, -----	John F. Kelley, New London, -----
	BEAVER VALLEY LIME CO., ELLWOOD CITY, PA.	
C- 636	Beaver Valley Hydrated Lime, -----	G. E. Walton Hardware Co., Beaver, -----
	BLAIR LIMESTONE CO., MARTINSBURG, W. VA.	
C- 647	Opequon Hydrated Lime, -----	C. S. Hunter Co., Washington, -----
C- 587	Opequon Hydrated Lime, -----	The Loucks Hardware Co., Scottdale, -----
C- 704	Opequon Hydrated Lime, -----	E. B. Maurer, Boswell, -----
	CENTRE COUNTY LIME CO., BELLEVILLE, PA.	
C- 673	Pure Hydrated Drilling Lime, -----	C. D. Bartholomew, Centre Hall, -----
C- 619	Pure Hydrated Drilling Lime, -----	Peffer & Son, Punxsutawney, -----
C- 723	Pure Hydrated Drilling Lime, -----	Peffer & Son, Punxsutawney, -----
	CHEMICAL LIME CO., BELLEVILLE, PA.	
C- 722	Hydrated Lime, -----	Peffer & Son, Punxsutawney, -----
	CLIMAX LIME AND STONE CO., WICK, PA.	
C- 560	Hydrated Lime, -----	George E. McQuiston, Grove City, -----
C- 532	Hydrated Lime, -----	P. J. Osterling & Son, Butler, -----
C- 642	Hydrated Lime, -----	S. Leroy Trittle, Sugar Creek, -----
	GROVE CITY LIMESTONE CO., GROVE CITY, PA.	
C- 638	(Clover Brand) Hydrated Lime, -----	F. P. Minner, Mount Pleasant, -----
	INDUSTRIAL LIMESTONE CO., BETHLEHEM, PA.	
C- 546	Bethlehem Brand Hydrated Lime, -----	Unknown, -----
	KELLEY ISLAND LIME AND TRANSPORT CO., CLEVELAND, OHIO.	
C- 738	Tiger Brand Agricultural Hydrated Lime,	Oil City Wood Working Co., Oil City, -----
	LEGORE COMBINATION LIME CO., LEGORE, MD.	
C- 606	Hydrated Lime, -----	M. T. Harkins, Hickory Hill, -----
	PALMER LIME AND CEMENT CO., NEW YORK, N. Y.	
C- 526	Challenge Brand Hydrated, -----	C. L. Brackbill, Strasburg, -----
C- 589	Challenge Brand Hydrated, -----	Harry Coleman, Lebanon, -----
C- 574	Challenge Brand Hydrated, -----	F. E. Houck, Catawissa, -----
C- 664	Challenge Brand Hydrated, -----	E. H. Keen & Co., Parkesburg, -----
C- 686	Challenge Brand Hydrated, -----	Thos. Knutzelman, Tower City, -----
C- 629	Challenge Brand Hydrated, -----	Nickles & Stewart, Shippensburg, -----
C- 605	Challenge Brand Hydrated, -----	Oxford Grain and Hay Co., Oxford, -----

## HYDRATED LIME—Continued.

Calcium Oxide.		Magnesium Oxide.		Carbon dioxide.	Insoluble matter.	Selling price per ton at place of selection.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
%	%	%	%	%	%	¢	
66.46	65.00	2.28	—	2.76	—	—	C- 625
69.11	65.00	2.49	1.00	—	1.55	12 50	C- 674
63.95	65.00	2.09	—	—	4.68	—	C- 620
65.91	65.00	0.65	—	—	4.42	12 00	C- 653
55.54	56.00	5.87	2.00	—	6.15	12 95	C- 663
59.56	55.00	1.12	1.10	—	4.62	12 00	C- 636
69.00	65.00	1.61	2.00	—	2.80	13 00	C- 647
67.22	65.00	1.51	2.00	—	4.16	14 00	C- 587
68.96	65.00	1.85	2.00	—	4.85	13 00	C- 704
67.51	67.00	1.19	1.38	—	0.80	12 25	C- 673
68.82	67.00	1.09	1.38	—	1.59	—	C- 619
69.50	67.00	1.16	1.38	—	0.80	14 00	C- 723
69.18	67.00	1.30	1.40	—	0.50	14 00	C- 722
61.94	65.00	0.72	0.80	—	4.73	13 00	C- 560
57.80	65.00	0.72	0.80	—	8.52	12 00	C- 582
66.24	65.00	0.77	0.80	—	4.70	11 00	C- 642
75.48	71.81	0.80	0.66	—	4.47	9 65	C- 638
69.14	65.00	3.38	3.00	—	0.87	—	C- 546
73.55	70.00	0.58	0.32	—	0.10	16 00	C- 738
56.21	55.00	4.95	1.00	—	5.57	12 50	C- 606
66.32	70.00	3.63	3.00	—	0.41	12 00	C- 526
65.91	70.00	5.09	3.00	—	1.55	—	C- 589
66.79	70.00	6.19	3.00	—	1.05	13 00	C- 574
70.06	70.00	3.56	3.00	—	0.30	13 50	C- 664
69.43	70.00	3.55	3.00	—	0.45	13 25	C- 686
71.16	70.00	2.61	3.00	—	0.07	12 50	C- 629
68.20	70.00	5.71	3.00	—	0.31	18 50	C- 605

TABLE II.—LIME AND

Chemist's number.	Name of Manufacturer and Brand	Sample Taken From—
C- 579	Challenge Brand Hydrated, -----	Reading Chemical Co., Reading, -----
C- 706	Challenge Brand Hydrated, -----	Jno. G. Simpson, Huntingdon, -----
C- 624	Challenge Brand Hydrated, -----	Burton Williams, Mifflinburg, -----
	THE PARAGON PLASTER AND SUPPLY CO., BLOOMSBURG, PA.	
C- 580	Paragon Hydrated Lime, -----	Harvey Doan, Berwick, -----
C- 728	Paragon Hydrated Lime, -----	J. Pallman, Clark Summit, -----
C- 668	Paragon Hydrated Lime, -----	J. A. Seguine, Cresco, -----
C- 583	Paragon Hydrated Lime, -----	A. E. Woodruff & Son, Wyalusing, -----
	ROBERT A. REICHARD, ALLENTOWN, PA.	
C- 542	Reichard's Lehigh Hydrated Lime, -----	Ralph W. Grames, Orefield, -----
C- 545	Reichard's Lehigh Hydrated Lime, -----	Harry Steily, Sacramento, -----
C- 684	Reichard's Lehigh Hydrated Lime, -----	E. M. Steily, Sacramento, -----
	ROSE POINT STONE AND LIME CO., NEW CASTLE, PA.	
C- 654	Peerless Hydrated Lime, -----	T. S. Bowman Est., East Hickory, -----
C- 624	Peerless Hydrated Lime, -----	Hibner Hoover Hardware Co., DuBois, -----
C- 726	Peerless Hydrated Lime, -----	Hibner Hoover Hardware Co., DuBois, -----
C- 715	Peerless Hydrated Lime, -----	The Loucks Hardware Co., Scottdale, -----
C- 677	Peerless Hydrated Lime, -----	S. N. Moore, Echo, -----
C- 618	Rose Point Hydrated Lime, -----	McEwen Hardware Co., New Bethlehem, -----
	SECURITY CEMENT AND LIME CO., HAGERSTOWN, MD.	
C- 568	Berkeley Hydrated Lime, -----	S. A. Fishburn, Harrisburg, -----
	THE STANDARD LIME AND STONE CO., BUCKLEYSTOWN, MD.	
C- 708	Standard Hydrated Lime, -----	Sheehan Brothers, Landenburg, -----
	STEACY & WILTON CO., WRIGHTSVILLE, PA.	
C- 630	"Sterling" Brand Hydrated Lime, -----	Diehl, Omwake & Diehl, Greencastle, -----
C- 550	"Sterling" Brand Hydrated Lime, -----	Farmers Association, Vintage, -----
C- 581	"Sterling" Brand Hydrated Lime, -----	W. D. Myers, East Berlin, -----
C- 711	"Sterling" Brand Hydrated Lime, -----	J. B. Rohrer, Port Treverton, -----
	TIDEWATER PORTLAND CEMENT CO., BALTIMORE, MD.	
C- 540	Tidewater Hydrated Lime, -----	G. B. Murphy, Red Lion, -----
	HYDRATED LIME. (High Magnesia and Dolomite Origin.)	Average, -----
	ANNVILLE LIME CO., ANNVILLE, PA.	
C- 687	Peerless Brand Hydrated Lime, -----	Reading Chemical Co., Reading, -----
C- 699	Snow Flake Hydrated Lime, -----	Eulalia Milling Co., Coudersport, -----
	DEITRICH BROS., READING, PA.	
C- 544	Deitrich's Gold Medal Brand Hydrated Lime.	A. J. Hamm, Germansville, -----
C- 680	Deitrich's Gold Medal Brand Hydrated Lime.	R. D. Oberholtzer, Elverson, -----
C- 583	Deitrich's Gold Medal Brand Hydrated Lime.	A. D. Trexler Sons, Trexler, -----

## HYDRATED LIME—Continued,

Calcium Oxide.		Magnesium Oxide.						Selling price per ton at place of selection.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.	Carbon dioxide.	Insoluble matter.				
%	%	%	%	%	%	%	\$		
70.00	70.00	4.95	3.00	-----	0.31	13 50		C- 579	
65.67	70.00	7.89	3.00	-----	0.75	12 75		C- 706	
68.22	70.00	3.94	3.00	-----	0.39	14 50		C- 684	
66.68	63.67	1.74	2.00	-----	2.17	-----		C- 580	
58.20	63.67	1.70	2.00	-----	3.60	11 00		C- 728	
59.53	63.67	2.10	2.00	-----	4.80	14 00		C- 668	
65.54	63.67	1.68	2.00	-----	2.86	13 50		C- 538	
70.67	65.00	3.37	3.00	-----	1.24	15 00		C- 542	
70.00	65.00	2.78	3.00	-----	1.02	16 00		C- 545	
69.27	65.00	2.61	3.00	-----	0.75	14 00		C- 684	
57.66	60.00	1.14	1.50	-----	11.89	12 50		C- 654	
48.92	60.00	1.22	1.50	-----	12.12	14 00		C- 624	
49.62	60.00	0.43	1.50	-----	15.30	14 00		C- 726	
52.71	60.00	0.94	1.50	-----	14.20	12 70		C- 715	
48.32	60.00	1.13	1.50	-----	13.31	11 50		C- 677	
54.69	60.00	1.12	1.50	-----	9.48	14 00		C- 618	
69.14	70.00	2.35	2.00	-----	0.65	14 50		C- 568	
67.90	70.00	2.72	2.00	-----	1.85	13 00		C- 708	
66.13	68.20	3.58	2.00	-----	2.58	13 50		C- 630	
68.44	68.20	3.06	2.00	-----	1.50	12 75		C- 550	
66.24	68.20	5.45	2.00	-----	1.91	12 50		C- 581	
65.24	68.20	4.24	2.00	-----	2.80	14 00		C- 711	
70.56	70.00	1.03	0.50	-----	1.92	13 00		C- 540	
64.90	-----	2.48	-----	-----	3.62	\$13 09	-----	-----	-----
61.61	65.00	10.14	3.00	-----	2.45	\$12 50		C- 687	
57.78	65.00	14.52	3.00	-----	2.25	15 00		C- 699	
48.09	46.00	30.40	30.00	-----	2.08	13 25		C- 544	
48.20	46.00	29.66	30.00	-----	0.85	-----		C- 680	
47.73	46.00	28.78	30.00	-----	2.04	13 00		C- 588	

TABLE II.—LIME AND

Chemist's number.	Name of Manufacturer and Brand	Sample Taken From—
C- 637	KELLEY ISLAND LIME AND TRANS- PORT CO., CLEVELAND, OHIO.	Harbison, Yahn Hardware Co., Ellwood City.
C- 675	Tiger Brand Agricultural Hydrated Lime,	McFarland Supply Co., Greensburg, -----
C- 562	KNICKERBOCKER LIME CO., PHILADELPHIA, PA.	J. J. Eshelman, Gibraltar, -----
C- 609	Hydrated Lime, -----	Wm. H. Fritz, Berwyn, -----
C- 529	Hydrated Lime, -----	H. H. Martin, Manheim, -----
C- 666	Hydrated Lime, -----	H. H. Martin, Manheim, -----
C- 665	Hydrated Lime, -----	Richard Scully, Pomeroy, -----
C- 645	JOHN D. OWENS & SON CO., OWENS, OHIO.	Bentleyville Hardware Co., Bentleyville, -----
C- 736	Clover Leaf Brand Agricultural Hydrated Lime.	Pringle Brothers, Milledgeville, -----
C- 679	Clover Leaf Brand Agricultural Hydrated Lime.	John D. Kauffman, Hamburg, -----
C- 565	PALMER LIME AND CEMENT CO., NEW YORK, N. Y.	Floyd Merkel, Hamburg, -----
C- 563	Snow Flake Brand Hydrated Lime, -----	J. P. Fisher, Douglassville, -----
C- 678	PHILADELPHIA LIME CO., PHILADELPHIA, PA.	Elias Gerhart & Son, Jonestown, -----
C- 707	Hydrated Lime, -----	F. E. Bailey, Northbrook, -----
C- 566	READING CHEMICAL CO., READING, PA.	Denny & Defer, Elizabethtown, -----
C- 576	Peerless Brand Hydrated Lime, -----	W. W. Feick, Kutztown, -----
C- 718	Peerless Brand Hydrated Lime, -----	John Hamm, Weatherly, -----
C- 525	STEACY & WILTON CO., WRIGHTSVILLE, PA.	Hershey, Leaman Co., Lititz, -----
C- 569	"Sterling" Brand Hydrated Lime, -----	E. B. Jermyn, Waymart, -----
C- 627	"Sterling" Brand Hydrated Lime, -----	A. P. Merkel, Fleetwood, -----
C- 564	CHARLES WARNER CO., WILMINGTON, DEL.	E. A. Morgan, Pine Grove, -----
C- 698	Cedar Hollow "Limoid", -----	Wm. H. Walker & Co., Kennett Square, -----
C- 548	Cedar Hollow "Limoid", -----	J. B. Chapman, Clark Summit, -----
C- 608	Cedar Hollow "Limoid", -----	Average, -----
C- 729	Cedar Hollow "Limoid", -----	
	Hydrated Lime, (Unknown).-----	

## HYDRATED LIME—Concluded.

Calcium Oxide.		Magnesium Oxide.		Carbon dioxide.	Insoluble matter.	Selling price per ton at place of selection.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
60.71	54.00	13.74	16.00		1.03	16 00	C- 637
60.57	54.00	13.11	16.00		2.10	14 00	C- 675
48.56	45.00	31.08	30.00		1.25	13 00	C- 562
48.28	45.00	32.09	30.00		1.53	15 00	C- 609
46.80	45.00	30.53	30.00		1.48	12 50	C- 529
48.84	45.00	31.83	30.00		1.20	12 25	C- 666
48.28	45.00	32.26	30.00		1.25	13 00	C- 665
55.94	55.00	13.79	12.00		1.28	10 00	C- 645
57.56	55.00	16.91	12.00		1.45	11 50	C- 736
58.57	65.00	13.18	3.00		3.25	12 50	C- 679
46.68	45.00	28.53	30.00		2.49	12 00	C- 565
58.90	65.00	13.88	3.00		3.00	13 50	C- 563
60.53	65.00	12.20	3.00		1.75	13 75	C- 678
60.31	68.20	14.43	2.00		2.55	14 00	C- 560
60.41	68.20	12.22	2.00		2.35	13 00	C- 627
45.41	42.00	31.65	28.00		1.10	13 50	C- 707
47.11	42.00	31.52	28.00		1.50	14 00	C- 566
46.22	42.00	30.96	28.00		1.09	13 00	C- 576
44.13	42.00	29.19	28.00		0.45	12 75	C- 718
45.82	42.00	30.63	28.00		1.38		C- 525
46.16	42.00	29.40	28.00		1.15	14 00	C- 698
45.53	42.00	30.70	28.00		1.86	12 50	C- 564
46.77	42.00	31.32	28.00		2.01	12 75	C- 548
46.63	42.00	30.46	28.00		1.12	13 50	C- 608
40.83	42.00	27.81	28.00		1.00	11 00	C- 729
51.80		24.23			1.67	\$13 10	

TABLE III.—GYPSUM OR

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—
C-536	THE AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK, N. Y. Fine Ground Nova Scotia Plaster, -----	E. H. Johnson, Ulster, ----- Wm. Kunkle, Bath, ----- W. S. Stuart, Carlisle, -----
C-561	Fine Ground Nova Scotia Plaster, -----	Average, -----
C-626	Ground Land Plaster, -----	

TABLE IV.—

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—
C-543	INDUSTRIAL LIMESTONE CO., BETHLEHEM, PA.	Ralph W. Grames, Orefield, ----- J. A. Seguine, Cresco, -----
C-667	Agricultural Lime Tailings, -----	Average, -----
C-558	Agricultural Lime Tailings, -----	
C-661	Berkeley Hydra Calcite Lime, -----	Francis Baker, Everett, ----- Biglerville Warehouse Co., Biglerville, ----- Holmes Book, Mexico, ----- S. A. Fishburn, Harrisburg, ----- Unknown, -----
C-534	Berkeley Hydra Calcite Lime, -----	
C-567	Berkeley Hydra Calcite Lime, -----	
C-541	Berkeley Hydra Calcite Lime, -----	Average, -----

## LAND PLASTER.

Moisture.	Calcium Oxide.			Sulphur Trioxide.			Gypsum (Estimated $\text{CaSO}_4$ ).	Insoluble matter.	Selling price per ton at place of selection.	Chemist's number.
	Found.	Guaranteed.	Found.	Guaranteed.						
%	%	%	%	%	%	%	%	%	-\$	
2.99	38.06	32.95	47.09	47.00	80.10	1.28	12.00	C- 536		
6.36	38.62	32.95	41.36	47.00	70.35	1.05	-----	C- 561		
4.07	30.10	30.48	42.43	45.00	72.17	4.10	-----	C- 626		
4.47	35.59	-----	43.63	-----	74.31	2.14	\$12.00	-----		

## MISCELLANEOUS SAMPLES.

Found.	Calcium Oxide.			Magnesium Oxide.			Insoluble matter.	Selling price per ton at place of selection.	\$	Chemist's number.
	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.					
%	%	%	%	%	%	%			\$	
62.05	50.00	4.71	3.00	4.73	11.50					C- 543
63.52	50.00	3.87	3.00	3.00	14.00					C- 667
62.79	-----	4.29	-----	3.86	\$12.75					
59.32	20.00	2.41	2.00	0.85	\$12.00					C- 558
56.46	20.00	2.10	2.00	0.95	10.50					C- 661
60.63	55.00	2.51	2.00	0.72	-----					C- 534
60.20	20.00	2.46	2.00	0.94	9.50					C- 567
60.08	20.00	2.36	2.00	1.02	11.50					C- 541
59.34	-----	2.37	-----	0.89	\$10.88					

